REMARKS

These remarks are responsive to the Office Action dated September 30, 2005 (hereinafter the "Office Action").

In response to the Office Action, applicant has cancelled certain claims, amended other claims as suggested by the Examiner, and added new claims, as set out above in the Amendments to the Claims. It is believed that these claims, including the new claims, distinguish over the cited references. Applicant thanks the Examiner for bringing these references to its attention.

Anticipation by Bourne et al.

In the Office Action, the Examiner rejected original Claims 1-5, 7-9, 11, 15, 18, and 20-22 as being anticipated by Bourne et al., stating that the cited reference taught proppant particles formed from a sol-gel of a ceramic compound such as aluminosilicates, which proppant particles could be coated and would have a density within the scope of original Claims 7 and 20. It is believed that the new claims enclosed herewith fully distinguish over Bourne et al.

Bourne et al. teaches a well treatment method including the use of porous proppants, which proppants may be composed of aluminum silicate ceramics (Col. 1, lines 45-48) that may be formed by sol-gel processes (Col. 2, lines 26-30). The apparently innovative aspect of Bourne et al., and the concept to which the reference is clearly addressed, is the impregnation of the porous proppant with a chemical treatment agent, which agent is intended to leach from the porous proppants into the well fluids over time to counter certain deleterious downhole conditions.

The claims of the present application, as presented herein, distinguish over the teaching of Bourne et al. Specifically, Bourne et al. neither teaches nor suggests the following features: (1) the blending of aluminosilicates and aqueous solutions of alkali metal silicates to form the

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proppant base material (see, for example, new Claim 23); (2) the use of geopolymer as a base material for the proppant particles (see, for example, new Claims 25 and 33); and (3) the use of unsintered ceramic as the base material for the proppant particles (see, for example, new Claim 27). As these features, alone or in combination, can be found in each of the claims presented herein, it is submitted that the claims are not anticipated by Bourne et al.

With specific reference to the second feature listed above, namely the use of geopolymer as a base material for the proppant particles, applicant would point out that this material has unique features and advantages that distinguish it from other aluminosilicates. Sintering or "firing" is generally seen as an essential feature of ceramic production (see, for example, the enclosed definition materials from the *Merriam-Webster Online Dictionary*, *Basic Inorganic Chemistry* (3d ed.) by Cotton et al., and *Fundamentals of Ceramics* by Barsoum), but geopolymers do not require sintering for production. Geopolymers were introduced in the 1970s by Joseph Davidovits, the term being used to classify a newly discovered geosynthesis that produces inorganic polymeric materials; geopolymerization occurs through geosynthesis, a reaction that chemically integrates minerals, involving naturally occurring aluminosilicates (see the enclosed materials from the website *www.geopolymer.org*). Applicant further encloses herewith two articles describing geopolymers: Ch. Kaps and A. Buchwald, "Property Controlling Influences on the Generation of Geopolymeric Binders Based on Clay"; and J. Davidovits, "Geopolymers: Inorganic Polymeric New Materials". While Bourne et al. does teach the use of aluminosilicates generally, the reference neither teaches nor suggests the advantages of using geopolymer material to form proppants.

Applicant would also point out that the "drying" taught in Bourne et al. is not for curing the proppant particles, but rather for drying the chemical treatment agent, another feature that distinguishes the present claims from the teaching of the cited reference.

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Anticipation by Kadner et al.

In the Office Action, the Examiner also rejected original Claims 1, 7-9, 13, and 14 as being anticipated by Kadner et al., stating that Kadner et al. teaches a method of forming aluminum oxide ceramic beads, formed from a sol-gel, wherein temperatures within the scope of original Claims 13 and 14 are used with density within the scope of original Claim 7. It is believed that the new claims enclosed herewith fully distinguish over Kadner et al.

Kadner et al. teaches a process for producing such beads for use as adsorbents in chromatography or as catalysts or catalyst carriers (Col. 1, lines 11-19). However, as was the case with Bourne et al. as discussed above, Kadner et al. neither teaches nor discloses the three features discussed above that are found alone or in combination in each of the claims presented herein, namely: (1) the blending of aluminosilicates and aqueous solutions of alkali metal silicates to form the proppant base material; (2) the use of geopolymer as a base material for the proppant particles; and (3) the use of unsintered ceramic as the base material for the proppant particles.

With specific reference to the third feature listed above, applicant would point out that Kadner et al. does not teach "curing" as that term is employed in the present application. The "curing" of Kadner et al. occurs at temperatures over 200°C, and accordingly sinters the base material, while the "curing" of the present application occurs below 200°C and does not sinter the base material. As sintering undesirably densifies the proppant material, negatively affecting the utility of the proppants, this is a significant distinguishing feature. Proppants according to preferred embodiments of the present invention are unsintered, employing chemical curing (with alkalinity as the catalyst) to accomplish polymerization.

That being the case, it is submitted that the current claims are not anticipated by Kadner et al.

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Anticipation by Collins et al.

In the Office Action, the Examiner also rejected original Claims 1, 6-9, 12-15, and 20-22 as being anticipated by Collins et al., stating that Collins et al. teaches the manufacture of iron oxide ceramic spherules, wherein the spherules may contain phosphates and would have a density within the scope of original Claims 7 and 20. It is believed that the new claims enclosed herewith fully distinguish over Collins et al.

Collins et al. teaches methods for preparing hydrous iron oxide spherules for use particularly as inorganic ion exchangers, and sol-gel processes are described (Col. 2, lines 37-39). However, as was the case with Bourne et al. and Kadner et al. as discussed above, Collins et al. neither teaches nor discloses the three features discussed above that are found alone or in combination in each of the claims presented herein, namely: (1) the blending of aluminosilicates and aqueous solutions of alkali metal silicates to form the proppant base material; (2) the use of geopolymer as a base material for the proppant particles; and (3) the use of unsintered ceramic as the base material for the proppant particles.

That being the case, it is submitted that the current claims are not anticipated by Collins et al.

Rejection of Claims as Unpatentable Over Bourne et al. in view of Youngman et al.

In the Office Action, the Examiner also rejected original Claims 9, 18, and 19 as being unpatentable over Bourne et al. in view of Youngman et al., with Youngman et al. adding the teaching of coating of the proppant particles. Applicant submits that, even when combined with Youngman et al., Bourne et al. still fails to teach the three features listed above, namely: (1) the blending of aluminosilicates and aqueous solutions of alkali metal silicates to form the proppant base material; (2) the use of geopolymer as a base material for the proppant particles; and (3) the use of unsintered ceramic as the base material for the proppant particles.

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That being the case, it is submitted that the current claims are patentable over Bourne et al. in view of Youngman et al.

Rejection of Claims as Unpatentable Over Bourne et al.

In the Office Action, the Examiner also rejected original Claims 9, 16, and 17 as being unpatentable over Bourne et al., as the Examiner concluded that it would be an obvious variation to utilize a rotary kiln rather than the oven or fluidized bed of Bourne et al.

The claims herein do not claim the use of a rotary kiln, and it is submitted that the rejection is accordingly overcome. Also, Bourne et al. fails to teach the three features listed above, namely: (1) the blending of aluminosilicates and aqueous solutions of alkali metal silicates to form the proppant base material; (2) the use of geopolymer as a base material for the proppant particles; and (3) the use of unsintered ceramic as the base material for the proppant particles.

That being the case, it is submitted that the current claims are patentable over Bourne et al.

Nonstatutory Double Patenting Rejection

In the Office Action, the Examiner also set out a provisional nonstatutory double patenting rejection, based on co-pending Patent Application No. 10/911,679. As the present application and the cited co-pending application are commonly owned by Global Synfrac Inc., a terminal disclaimer is being filed herewith, in accordance with 37 C.F.R. § 1.321(c). It is believed that the rejection is accordingly overcome.

Claims 10 and 11

Finally, in the Office Action, the Examiner stated that original Claim 10 was objectionable as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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The applicant has accordingly amended Claim 10 herein, now being in independent form including all of the limitations of the base claim and any intervening claims. It is believed that Claim 10 as amended is accordingly allowable.

In addition, original Claim 11 was dependent on original Claim 10. Claim 11 remains dependent on Claim 10 as amended. It is accordingly submitted that Claim 11 should also now be allowable.

CONCLUSION

In light of all of the above, it is submitted that the claims are now in order for allowance, and prompt allowance is earnestly requested. Should any issues remain outstanding, the Examiner is invited to call the undersigned attorney of record so that the case may proceed expeditiously to allowance.

Respectfully submitted,

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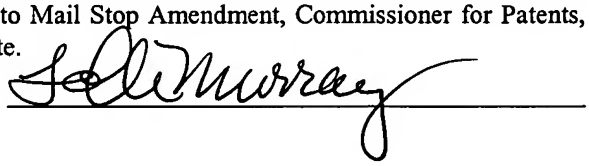
Date: December 30, 2005 

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